

standing on a flat ground by bare feet with the toes completely elevated.--

Page 5, please add the following sentences in the end of the section entitled "BRIEF DESCRIPTION OF THE DRAWINGS":

--Fig. 5 is the cut-view of the form-correcting shoes with the shoes sole under the toes.

Fig. 6 is the cut-view of the form-correcting shoes without the shoes sole under the toes.--

Please change the second half of the section entitled "DETAILED DESCRIPTION OF THE INVENTION", that is, the last paragraph of page 13 to the end of the section, page 22, as follow:

--Another important point to playing sports well is that one must not lose body balance control during the play. To do so, the backbone should be fixed to the pelvis, the upper arms fixed to the shoulders, and all skeletal muscles of the body should be equally alert so that the body moves as if there is a spring inside. If some muscles contract too strong while some too weak, the reactions against the ball will be late and the player cannot hit the ball as he images. And, while moving the body weight center should be in the middle of the part of the feet that touch the ground, otherwise players will find difficulty in moving with good balance and hitting the balls with good control.

Nowadays, not only sports shoes, but also almost all kinds of shoes

(including slippers, sneakers, boot, etc) are designed so that the heel part is higher than the sole and toe part. Recently, I found out that this design is the cause of difficulty in playing tennis with correct forms and good body control. When a man stands straight on a flat ground wearing shoes with the heel part higher than the sole and toe part, the body weight center is not in the middle of the feet but near to the heel. Wearing this kind of shoes, if he twists his body the shoulders move over  $90^{\circ}$  and the upper arms move more than that. This is because the center of body twisting is higher than the joint between the sacrum and the fifth lumbar vertebra and the adduction and abduction of the upper arms are not suppressed, that is the upper arms are not fixed to the shoulder. In this condition, if he twists his body to the left and to the right, one will find that the hips and buttocks will largely shake. This means that a part of body twisting force is un-necessarily used in shaking the hips and buttocks. And, when he walks or runs, usually, the heel touches the ground first followed by the sole and toe part. In this process the body weight center moves on two surfaces of the foot, i.e., from the face consisting of the heel and the sole to the face consisting of the sole and the toes. And from one foot to the other, the body weight center transfers from the surface of the sole and the toes of one foot to the surface of the heel and the sole of the other foot. In this movement, the body weight is lifted up. With the body weight center always moving from the heel to

the sole and toes and lifted up while walking and running, it is not easy to hit hard ball with good control. Furthermore, when the upper arms are not fixed to the shoulder, the body twisting force cannot be effectively transferred to the arm. Therefore, it is not easy to play tennis and other sports wearing shoes with the heel part higher than the toe part. Since all skeletal muscles are not equally in alert condition, one will feel free to swing his arms and legs, to move any joints and to walk with soft and good looking style wearing this kind of shoes, the same way that fashion models walk wearing shoes with high heels. This may be the reason why shoes with the heel higher than the sole are so popular nowadays.

Somebody may question why professional tennis players can play well with this type of shoes. The answer is that because, although it is doubtful that they understand the mechanism, they always lift their heel parts and stand on their sole and toe parts during the play so that the body weight center becomes in the middle these parts, thus the backbones are fixed to the pelvis, the upper arms are fixed to the shoulders, i.e., the condition as if having a spring in the body. And while walking or running, the body weight center transfers from the surface consisting of the sole and the toes of one foot to the same surface of the other foot, thus, the body weight center does not move on the foot and is not lifted up. The problem of this way of playing tennis is that players have to

intentionally stand on their soles and toes. This means that ones have to practice a lot like the professionals do until they can automatically stand on their toe to make the condition as having springs in their bodies. Because the areas of the toe parts are not large, players cannot stand still so long on one foot and wait until the ball comes to the best point to hit. This is why many professionals still find it difficult to do good drop shots.

Recently, I came to realize that, when a man stands still and straight on his bare feet on a flat ground with his toes completely lifted, the center of body weight, then, positions in the middle of the planes consisting of the heel and the sole, which are touching the ground, and all skeletal muscles are in the alert condition (ready to move), the backbone and the pelvic are fixed together, and the upper arms fixed to the shoulders, i.e., the condition as if having spring in the body. These will happen automatically as long as the distance between the feet is not larger than the width of the pelvis. We can check this by standing straight on bare feet on a flat ground with the toes completely lifted up, i.e., the body weight is not on the toes, and twisting the body to left and right without raising the feet and the knee joints being stretched. We will find that the shoulders can move only about  $60^\circ$ , and the upper arms will not move beyond the shoulders. And when one walks or runs with bare feet on a flat ground with the toes lifted up, the heel and the sole will touch the ground almost

simultaneously and the body weight center will be in the middle of the plane consisting of the heel and the sole every time the body weight is on one foot and the body weight will never be on the toe. As described before, with the body in this condition, it is easy to play tennis with correct forms and good body control. However, though the heels and the soles are at the same height, if one let some part of the body weight be on the toes no matter the position of the toes is higher or the same as or lower than the soles and the heels, the condition as having a spring in the body is immediately lost. One can check this by standing straight on flat ground by bare feet and attaching the toes to the ground, or standing straight on flat ground and putting only the toes on a carpet, or standing straight on a carpet and attaching only the toes to the ground, and twisting the body. He will find that he can move his forearms much wider than the shoulders because the forearms are no longer fixed to the shoulders.

I have tried playing tennis with shoes in which only the sole parts not the toe parts have been heightened by some pieces of clothes so that when wearing the heel of the foot is as high as the sole, and the body weight is not on the toes. To be concrete, as shown in fig. 5, tennis shoes, addidas, size 26.5 cm, of which the heel (8) part of the shoes sole (11) is higher than the sole (9) and the toes (10) parts, were used. The sole part has been heightened by some pieces of cloth (12) so that the sole part is as high as the heel part which is

about 2.5 cm (a) and is higher than the toe part (b). These shoes are originally designed to have the base surface of the toe part curving up from the ground with an angle (c) larger than 7 degrees. Having the height of the toe part significantly lower than that of the sole and the heel, together with having the base surface of the toe part curved up from the ground are important for the purpose not to let the body weight be on the toes either when standing still and walking or running; that is, only the surfaces consisting of the heels and the soles are used and the surfaces consisting of the soles and the toes are always not used. If the base surface of the toe part is not curved up enough from the ground, the body weight will be on the toes at the last moment when the body weight is going to shift from one foot to the other and the body balance loss will occur. In case that the heel and sole parts of the shoes sole are at the same height and are high enough, there is no need to have the shoes sole under the toes as shown in figure 6.

Wearing the form-correcting shoes, there is no need to use the form-correcting shoulder and waist belt, since the forearms will automatically fixed to the shoulder and the pelvic fixed to the backbone. It became clear that I could play much better with the form-correcting shoes described above than with tennis shoes sold in tennis shops. And while walking and running, the body weight center is always in the middle of the surfaces consisting of the

heels and the soles, and the body weight does not fall on the toes. In other word, the player is forced to use only the surfaces consisting of the heels and the soles and not use the surfaces consisting of the soles and the toes by using the form-correcting shoes. Since the surface area is much larger, players can stand still by one foot on the surface consisting of the heel and sole, and wait longer for the timing to hit the ball and hit stronger and better controlled balls, compared to standing only on the surface consisting of the sole and toes, the way most professionals do. Wearing shoes with heel part higher than the sole and toe part, players cannot use only the surfaces consisting of the heels and soles since the body weight center will move from the heel to the sole and the toes while moving unless one stands only on the surfaces consisting of the soles and toes all the time during the plays.

My form-correcting shoes (including boots, sneakers, slipper and sandals) are, therefore, designed so that when a man wears these shoes and stands straight on a flat ground, his heels are as high as the soles with body weight not on the toes as he is standing straight on his bare feet on flat ground with the toes completely elevated. The purpose of wearing the form-correcting shoes is to gain the condition that the backbone is fixed to the pelvis, the upper arms are fixed to the shoulders, and all skeletal muscles are equally in alert condition, when standing straight, wearing the shoes with the heel and sole touching

completely to a flat ground. Therefore, shoes with minute difference in height between the heel and the sole, such as 0.1 mm, should not be considered out of my claim, as long as they can provide the above condition. However, the permissible difference is not going to be so large. I have confirmed that the purposed condition cannot be gained with 1-mm-difference in height between the heel and the sole, or between the inner part and the outer part of the sole. In order to make the sole part to be as high as the heel part, one may use insole pads to heighten the sole part of the shoes originally with the heel higher than the sole and toes. For shoes having changeable spikes such as football, baseball and golf shoes, one may change the spikes of the sole to the higher ones so that the sole becomes as high as the heel.

That the shoes with the heel part higher than the sole and toe part makes it difficult to play sports with correct forms is not limited only to tennis, but is true for other sports. For examples, in short-distance running race, runners use only the surfaces consisting of the soles and toes. As mentioned before, they, therefore, can get the condition of having a spring in the body. However, in long-distance running such as marathon race or walking race, in which racers have to use the heel, sole and toes every time when the body weight is on one foot, they have to use un-necessary power to balance themselves since the body weight center will move on their feet. Wearing these shoes, the



backbone is not fixed to the pelvis, and the upper arms are not fixed to the shoulders, a part of the body twisting force will, therefore, be lost in shaking the buttocks and arms. Ones may be familiar with a scene that walking racers largely shake their buttocks. This kind of energy loss has great effect on long-distance races. Racing time will be shortened a lot if without this energy loss. All of these problems can be solved easily by wearing the form-correcting shoes. The hips and buttocks will almost not shake while walking with high speed wearing the form-correcting shoes.

As described above, the form-correcting shoes help players play well with correct forms especially sports using rackets or bats or clubs, such as tennis, badminton, baseball and golf, and other kinds of sports. Moreover, the form-correcting shoes are also suitable to be used as mountain climbing boots, walking shoes and working shoes, even as slipper and sandals. Since the persons, who wear the form-correcting shoes, will gain the condition as having a spring in the body, i.e., all skeletal muscles are in an equally alert stage, they will find themselves not easy to tumble down, to get tired and to get muscular pains. According to my knowledge, up to now my form-correcting shoes are the only ones that are designed so that, when wore the body weight does not fall on the toes during standing still or walking or running. Because of this design, it not easy to jump wearing the form-correcting shoes, thus they may